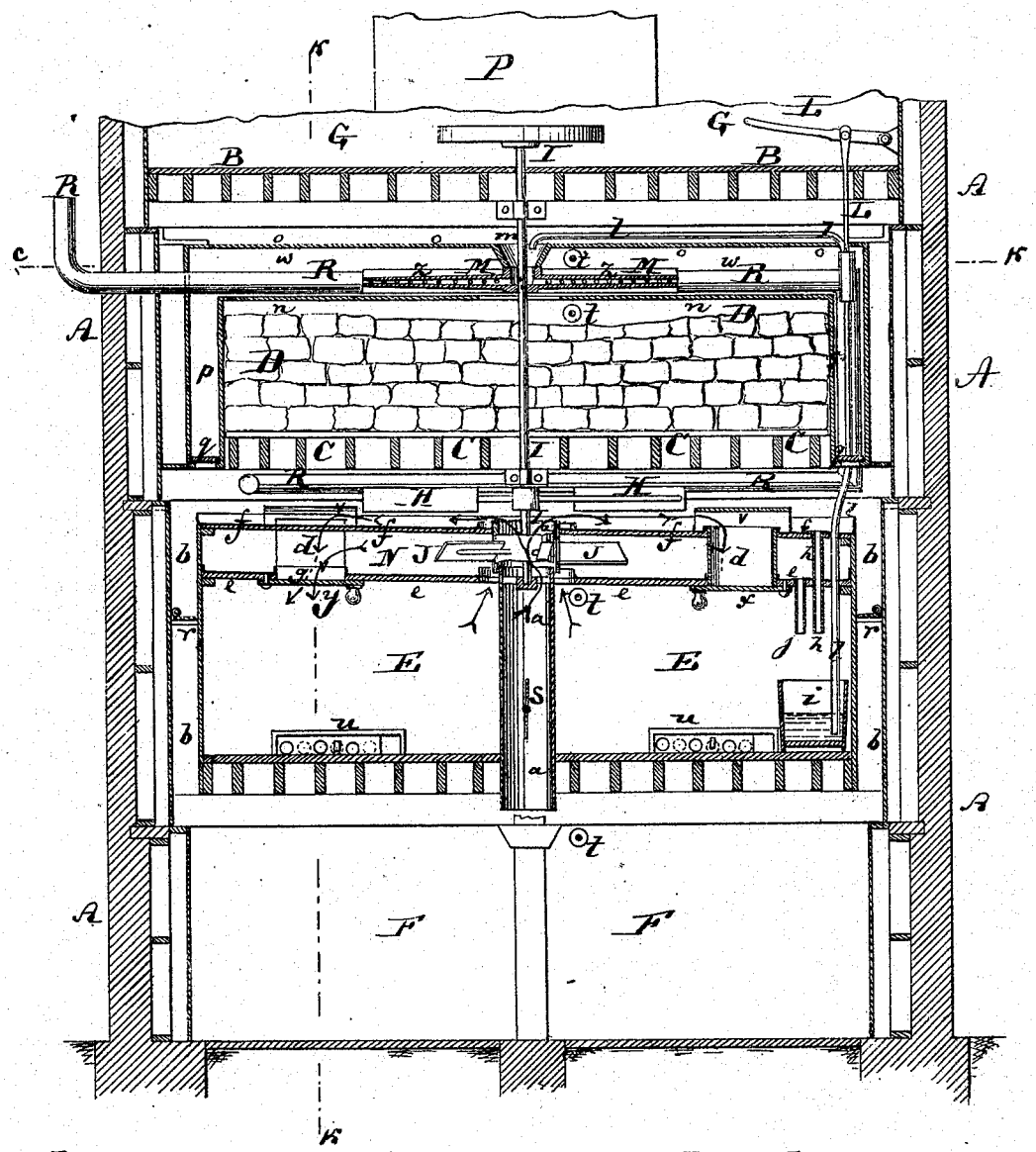
3 Sheets--Sheet 1.

T. KRAUSCH.

Refrigerator Building.

No. 164,744. Patented June 22, 1875.

Fig: 1



Witnesses:

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F. v. Briesen

Inventor:

Theo. Krausch
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3 Sheets--Sheet 2.

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Fig: 2

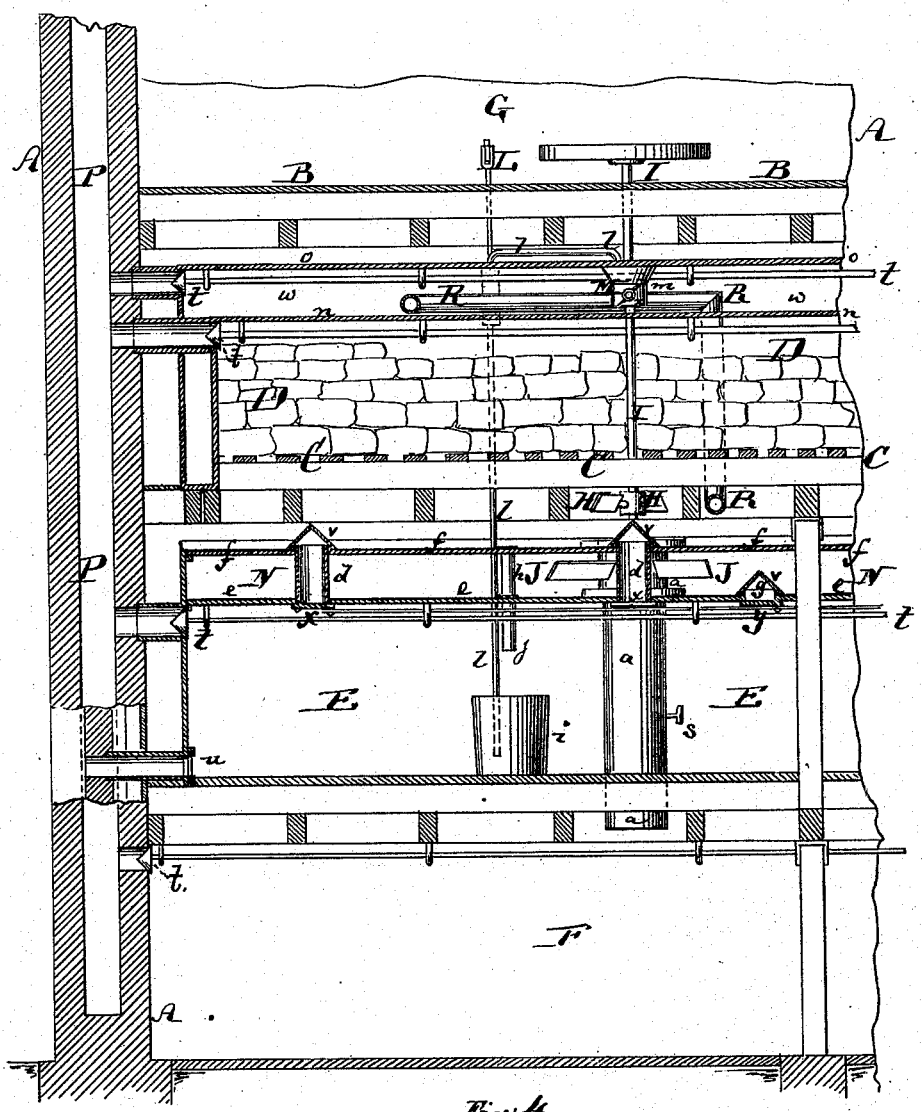

Fig: 4

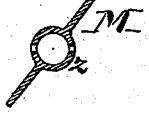

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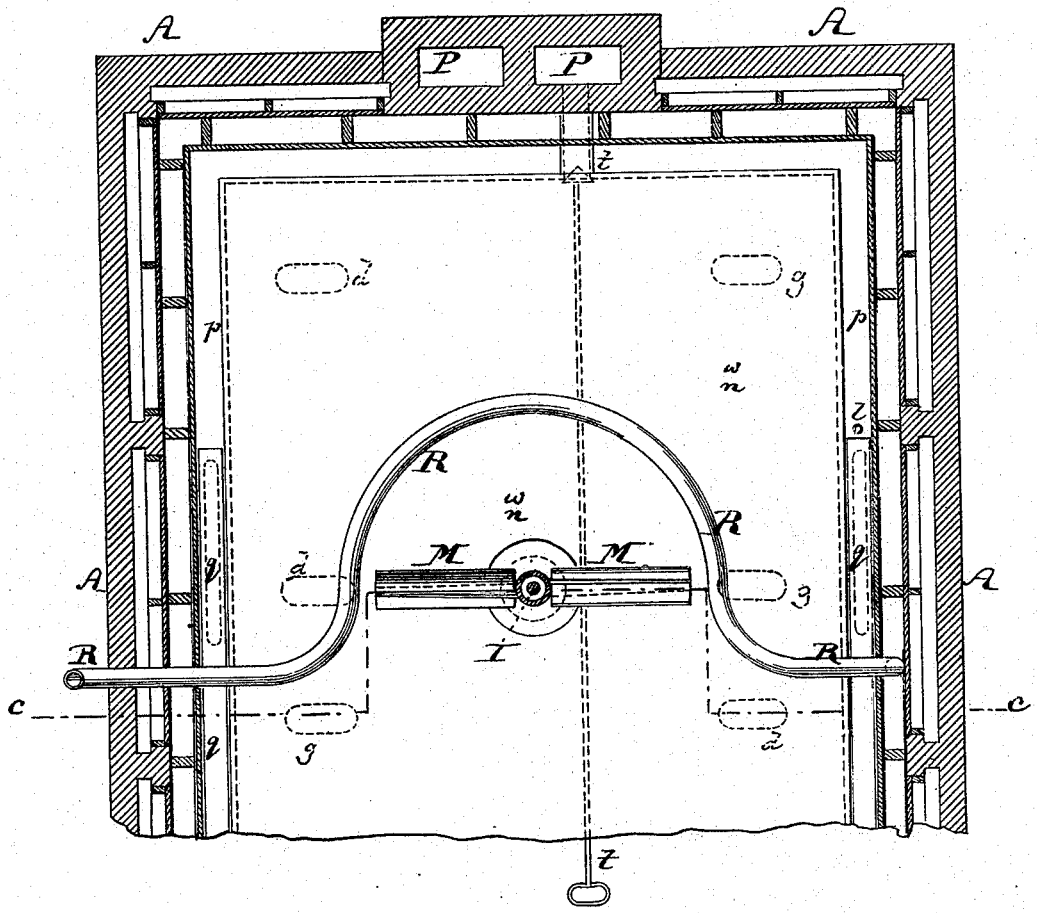
Fig: 3



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UNITED STATES PATENT OFFICE.

THEODORE KRAUSCH, OF NEW YORK, N. Y.

IMPROVEMENT IN REFRIGERATOR-BUILDINGS.

Specification forming part of Letters Patent No. **164,744**, dated June 22, 1875; application filed August 29, 1874.

To all whom it may concern:

Be it known that I, THEODORE KRAUSCH, of the city of New York, in the county and State of New York, have invented a new and Improved Refrigerator-Building, of which the following is a specification:

Figure 1 is a vertical transverse section of my improved refrigerator-building, the line *c c*, Fig. 3, indicating the plane of section. Fig. 2 is a vertical longitudinal section of the same, taken on the plane of the line *k k*, Fig. 1. Fig. 3 is a horizontal section of the same, on the line *c k*, Fig. 1. Fig. 4 is a detail transverse section of one blade of the hollow fan used in my invention.

Similar letters of reference indicate corresponding parts in all the figures.

This invention relates to a new construction of building, to be used by brewers and others, as an ice-house or refrigerator-building, for preserving in a cold state the fermented liquors or other substances that may have to be stored in such building. The invention consists, principally, in the application to the refrigerator-building of mechanism for creating artificial currents of air within the building, and, far more rapidly than could be done by mere natural process, bringing the warm air in contact with the cooling medium, and the colder air in contact with the matter to be preserved or cooled. By proper mechanism, having this end in view, the consumption of ice or other cooling substance in ice-houses or refrigerator-buildings may be reduced to a very great extent, inasmuch as an immense waste of ice is now occasioned by the insufficient circulation of ordinary ice-houses. Before describing more minutely the details of my invention, I desire it to be understood that by the term refrigerator-building I mean any structure used either with ice or with other suitable natural or artificial cooling medium or process.

In the accompanying drawing, the letter A represents the wall of the ice-house or building; B, a horizontal floor above the ice chamber D; and C the horizontal grating or other support within the ice-chamber for the ice or other cooling medium. D is the ice-chamber, or cooling-chamber. I have shown this ice-chamber to be located above two chambers, E and F, for containing the substance to be cooled. I have also shown it to be located below the chamber G, for containing the substance to be cooled, and I mean to indicate by this that I can arrange my ice chamber either at the top of the structure, or at the bottom of the same, or at or near the middle, for, with the mechanical means used by me, I can either produce a current which will carry the warm air up to the ice and the cold air down from the ice, or a current which will carry the cold air up from the ice and the warm air down to the ice.

The mechanical means employed by me for creating these artificial currents is a rotary fan, H. This fan, in the drawing, is shown to be mounted upon a vertical shaft, I, between the ice-chamber D and the chambers E and F, containing the matter to be cooled, and is thus shown to be beneath the ice, although above the drip-floor *f* of the ice-chamber. It serves to draw the warmer air from the upper part of the chamber F upward through a trunk, *a*, into the lower part of the ice-chamber, beneath the ice-support C, and then to spread the air thus raised along the lower part of the ice-chamber, where it will commingle with the coolest air in the entire structure. This cold air can then, through side flues *b b*, descend again to the chamber F, or it may be conveyed through flues *d d* into the chamber E. At any rate, it is utilized for cooling the contents of one or both of said chambers. Another fan, J, is mounted upon the same shaft, I, directly above the ceiling *e* of the chamber E, and beneath the drip-floor *f* of the ice-chamber D. This fan J is secured to a section of the air-trunk *a*, which section is connected with the shaft I, to revolve with the same. Thus the air-trunk is continued above the fan J, and still said fan J can revolve with the shaft that is centrally within such trunk. The fan J serves to raise the warm air from the upper part of the chamber E, and to spread it along the under side of the very cold drip-floor *f*, and discharge it down into E again, through openings *g g* in the ceiling *e*. Suitable slides *x* are arranged beneath the openings *d*, and similar slides *y* are under the openings *g*, for closing them if required, and opening them more or less when necessary. Now, it will be seen that the fans H and J are used for raising the warm air

and depressing the cold air, but if the ice is arranged at the bottom of an ice-house the fans will be used for raising the cold air from the ice and conveying back the warm air to the ice, the result being, in either case, a complete and free distribution of cold air in the chambers which are to be cooled, and the consequent saving of ice, as I find that with this construction I can reach the same result with about six hundred tons of ice that would heretofore be only obtainable with at least one thousand tons of ice.

The drip-floor *f* may be slightly inclined, as indicated in Fig. 1, or otherwise so arranged that the water dripping upon it will all find its way into an escape-pipe, *h*, through which such drip-water is finally conducted into a receptacle or tub, *i*. The moisture which is drawn up with the warm air by the fan J will condense on the under side of the cold drip-floor *f* and drip down upon the ceiling *e*, whence it is conducted by a pipe, *j*, into the same receptacle or tub *i*. The drip-water thus collected in *i* is still considerably cold, and its low temperature is by me utilized in the following manner:

A pump, L, of suitable construction, carries the drip-water from the tub *i* through a pipe, *l*, into a funnel, *m*, which embraces the shaft I above the ice-chamber, as shown. From this funnel the water flows into a central opening of the hollow fan M, that is mounted upon the shaft I, and which has perforated tubes *z*, secured in its blades, for throwing the cold water out in jets or fine spray. The drip-water, which is, by the pump L, conducted into the center of the hollow fan M, is then, when M is rotated by centrifugal force, carried into the perforated tubes *z* of its wings, which communicate with the hollow center of the fan, and thrown from the apertures in such tubes in a fine spray. The water thus projected by the hollow fan M evaporates and serves thereby to cool the air above the ice-chamber, such air being contained in a chamber, *w*, which is formed between the ceiling *n* of the ice-chamber and a horizontal floor, *o*, as shown. From this air-chamber *w* the air which is cooled can, if desired, be caused to descend into the lower chambers E F through side trunks *p*, thence into the side trunks *b*, if it is desired to conduct it to the chamber F, or from *p* into the lower part of the ice-chamber; to fall thence through the tubes *d* into the chamber E. But when the valves *q*, which are arranged in the lower parts of the trunks *p*, are closed the air in *w*, cooled by the spray thrown from the hollow fan M, will serve to produce a cold stratum of air above the ice-chamber, and thus cool the surroundings of such ice-chamber and preserve the ice from too rapid destruction. Suitable valves *r r*, or gates, are also arranged in the side trunks *b b*, to arrest the downward passage of the cold air through the same, and a valve or damper, *s*, is also arranged in the central air-trunk *a*, so that, by means of the valves *r* and *s*, communication with and circulation of air through the chamber F may be arrested. Each chamber in the building communicates at its upper part, by means of a proper opening, with an air flue or flues in a chimney, P, valves *t t* serving to close these openings, when desired, or to more or less open the same. The openings to these flues in P are arranged at the upper parts of the respective chambers for discharging the warmer air that may not be needed. For the discharge of vicious air, that may collect in the lower parts of the several chambers, suitable registers *u u* may be arranged in the latter for communication with the outside air, as indicated in Figs. 1 and 2. Fresh air is conducted into the structure through a pipe, R, which passes first through the chamber *w* and then down through the lower part of the chamber D, between the grate C and the drip-floor *f*, as shown, so that, by this position of the pipe R, the air conducted through it into the building is first cooled and then discharged into the place where it is likely to meet with the coldest air of the house.

The air-tubes *d* and *g* are covered with roof-like plates V, as shown in Fig. 2, and have their upper edges raised, as indicated in Fig. 1, in order to prevent the water that may drip upon the floors *f* and *e* from flowing down through such tubes.

It will be observed that by arranging the ceiling *e* of the chamber E beneath the drip-floor *f* of the ice-chamber an air-space, N, is formed, which will be a reservoir of cool air above the chamber E, and which, moreover, is indispensable, wherever the fan J is to be employed.

I claim as my invention—

1. The combination of the drip floor *f*, separated from the bottom C of the ice-chamber, with the ceiling *e* and the sides of the cooling-chamber E, whereby an air-chamber, N, is formed, substantially as shown and described.

2. The combination of the fan J with the drip-floor *f*, ceiling *e*, and with the sides of the chamber E, forming the chamber N, for operation substantially as specified.

3. The air-passages *d* and *g* in the drip-floor *f* and ceiling *e*, combined with the fans H and J, whereby cool air is circulated from the central flue to the air-chamber under the ice, and to cool the air-space N under the drip-floor, and thence back into the cooling-chamber, as described.

4. The hollow fan M, having perforated tubes *z* secured in its blades, and connecting with a central opening of said fan, substantially as and for the purpose herein shown and described.

5. The drip-tub *i* of the ice-house, combined with the pump L and hollow fan M, as set forth.

THEODORE KRAUSCH.

Witnesses:

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F. V. BRIESEN.